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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/254,119	04/16/1999	KOHEI TATSUMI	52433/545	6495

26646 7590 08/14/2002

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NEW YORK, NY 10004

EXAMINER

CHAMBLISS, ALONZO

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 08/14/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/254,119

Applicant(s)

TATSUMI ET AL.

Examiner

Alonzo Chambliss

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 5/28/02(amendment E).
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-6, 16 and 17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-6, 16 and 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. Amendment E filed on 5/28/02 has been entered and made of record in Paper No. 22.

Response to Arguments

2. Applicant's arguments with respect to claims 3-6, 16, and 17 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

3. Claim 16 is objected to because of the following informalities: the symbol " – " between semi and conductor needs to be deleted. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 3-6, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Juskey, Jr. et al. (U.S. 4,940,181), Greer (U.S. 5,470,787), Boyd et al. (U.S. 6,254,923) in view of Periodic Table of the Elements.

With respect to Claims 16 and 17, Juskey discloses electrodes 18, 20, 22 (i.e. the combination of the copper, nickel, and gold layers) formed on a substrate 10 with each bumps 30 consisting of an spherically formed metal ball (i.e. solder material) having a given size. An adhesive 26 is bonded to the electrodes 18, 20, 22 for attachments of the bumps 30, wherein each electrode 18, 20, 22 includes a layer of an electrode material 20 (i.e. nickel layer) and at least one layer 22 laminated to the layer the electrode material 20 (see col. 2 lines 50-60; Figs. 2-4). The at least one layer 22 has a thickness which is smaller than that of the electrode material 20, since the at least one layer has a thickness of .04 mils and the electrode material has a thickness of .15 mils (see col. 2 lines 52-60). The combination of layers 18, 20, 22 forming an electrode would avoid deterioration of bonding, since the composition and thickness of the combination of copper, nickel, and gold layers would strengthen the bond between the solder ball to the substrate. The at least one layer 22 has peripheral dimensions substantially the same as the electrode material 20. The metal balls are adhesively bonded to the electrodes 18, 20, and 22 with a flux 26 (see col. 3 lines 26-30; Figs. 2-4). The substrate is to be mounted to a chip 28 by flip chip bonding wherein the electrodes

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18, 20, 22 are directly connected to electrode terminals on the chip 28 through the bump material of the metal balls 30 (see Figs. 2-4). One skilled in the art would readily recognize that the terminals exist on the chip 28, since the metal ball establishes electrical communication between the chip internal circuitry and the substrate. Juskey fails to explicitly disclose a chip with an electrode including a layer of an electrode material and at least one layer. However, Greer discloses a chip 24 with an electrode including a layer of an electrode material 36 and at least one layer 38 (see col. 5 lines 11-24; Figs. 2, 5, 6). Therefore, one skilled in the art would readily recognize that an electrode with a layer of electrode material and at least one layer can function on a chip, since the electrode material and the at least one layer provide a stable electrical connection between the chip and the substrate as taught by Greer.

With respect to Claim 3, Juskey discloses the electrodes 18, 20, 22 formed from an electrode material of copper 18 (see col. 2 lines 52-60).

With respect to Claims 4 and 5, Juskey discloses a layer of an electrode material composed of copper 18 (see col. 2 lines 50-54). Juskey fail to explicitly disclose a layer of an electrode material composed of Al. However, one skilled in the art would readily recognize that Al (i.e. aluminum) is a material that is easily substituted for copper as evidence by Boyd et al. (see col. 4 lines 17-21). Juskey discloses at least one metal layer 20 laminated to the electrode material layer 18 and having a melting point higher than the electrode material 18, since the at least one metal layer 20 is made of nickel (Ni) and the electrode material is made of aluminum (Al). Nickel (Ni) has a melting point

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of 1726K and aluminum has a melting point of 933.25K as evidence by the Periodic Table of the Elements.

With respect to Claim 6, Juskey discloses the at least one layer 20 laminated to the electrode material 18 and contacted with the electrode material layer is formed of nickel (Ni) and the least one layer farthest from the electrode material layer 18 contacted with the metal ball 30 is formed from gold (Au) (see col. 2 lines 52-60).

The prior art made of record and not relied upon is cited primarily to show the process of the instant invention.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

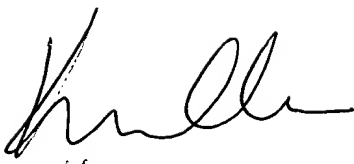
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143.

The fax phone number for this Group is (703) 308-7722 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956.


Klaus
Primary Examiner

AC
AC/July 31, 2002